

**FCC TEST REPORT** 

# Test report On Behalf of SHENZHEN UGOOD TECHNOLOGY CO.,LIMITED For Suction-cup Bluetooth Speaker

Model No.: M1,M2,M3,M4,M5,M6,M7,M8,M9,M10 FCC ID: 2AGA5-M1

Prepared for: SHENZHEN UGOOD TECHNOLOGY CO.,LIMITED

2/F, 52Bldg, Bantian third industrial zone, longgang District, Shenzhen

Prepared By: WST Certification & Testing (HK) Limited

12/F., San Toi Building,137-139 Connaught Road Central,Hong Kong

Date of Test: Oct. 19, 2015 ~ Oct. 24, 2015

Date of Report: Oct. 24, 2015
Report Number: WST151019007



# **TEST RESULT CERTIFICATION**

| Applicant's name   | : SHENZHE  | N UGOOD TECHNOLOGY CO.,LIMITED   |
|--|--|--|
| Address  | : 2/F,52Bldg,                                    | Bantian third industrial zone,longgang   |
|  | District,She                                     | enzhen   |
| Manufacture's Name   | : SHENZHE  | N UGOOD TECHNOLOGY CO.,LIMITED   |
| Address  | : 2/F,52Bldg,                                    | Bantian third industrial zone,longgang   |
|  | District,She                                     | enzhen   |
| Product description  |  |  |
| Trade Mark:  | N/A  |  |
| Product name   | : Suction-cup                                    | Bluetooth Speaker  |
| Model and/or type reference  | ce: M1,M2,M3,                                    | M4,M5,M6,M7,M8,M9,M10  |
|  |  | and Regulations Part 15 Subpart C Section 15.249<br>1: 2014  |
| the material. WST Certifice assume liability for damage due to its placement and compare of Test | cation & Testing<br>es resulting fron<br>ontext. | ed is acknowledged as copyright owner and source of (HK) Limited takes no responsibility for and will not a the reader's interpretation of the reproduced material Oct. 19, 2015 ~ Oct. 24, 2015 |
| Date of Issue  | : c  | Oct. 24, 2015  |
| Test Result  | : F  | Pass   |
| Testing E  | ngineer :  | (Eric Xie)   |
| Technica   | l Manager :                                      | DOPA Q'IN (Dora Qin)   |
| Authorize  | ed Signatory:                                    | town.  |

(Kait Chen)





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#### 1.. TEST SUMMARY

#### 1.1. Test Procedures And Results

DESCRIPTION OF TEST

CONDUCTED EMISSIONS TEST

RADIATED EMISSION TEST

BAND EDGE

OCCUPIED BANDWIDTH MEASUREMENT

ANTENNA REQUIREMENT

RESULT

COMPLIANT

COMPLIANT

COMPLIANT

COMPLIANT

### 1.2. Test Facility

Test Firm : Shenzhen WST Testing Technology Co., Ltd.

Certificated by FCC, Registration No.: 939433

Address : 1F,No.9 Building,TGK Science & Technology Park, Yangtian Rd.,

NO.72 Bao'an Dist., Shenzhen, Guangdong, China. 518101

Tel : (86)755-33916437 Fax : (86)755-27822175

#### 1.3. Measurement Uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz) = 3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz) = 4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz) = 4.06dB, k=2



# 2.. GENERAL INFORMATION

# 2.1. General Description of EUT

| Equipment              | Suction-cup Bluetooth Speaker                           |
|------------------------|---|
| Model Name             | M1,M2,M3,M4,M5,M6,M7,M8,M9,M10                          |
| FCC ID                 | 2AGA5-M1  |
|                        | All the model are the same circuit and RF module,except |
| Model Difference       | the appearance colour, this report only test mode name: |
|                        | M1  |
| Antenna Type           | Internal monopole Antenna                               |
| BT Operation frequency | 2402-2480MHz  |
| Number of Channels     | 79CH  |
| Modulation Type        | GFSK  |
| Power Source           | DC 5V   |
| Power Rating           | 1   |
| Adapter Model          | 1   |



2.1.1. Carrier Frequency of Channels

| 2.1.1. Cal | 2.1.1. Carrier Frequency of Channels |         |           |         |           |  |  |  |  |  |
|------------|--------------------------------------|---------|-----------|---------|-----------|--|--|--|--|--|
| Channel    | Frequency                            | Channel | Frequency | Channel | Frequency |  |  |  |  |  |
|            | (MHz)                                |         | (MHz)     |         | (MHz)     |  |  |  |  |  |
| 01         | 2402                                 | 31      | 2432      | 61      | 2462      |  |  |  |  |  |
| 02         | 2403                                 | 32      | 2433      | 62      | 2463      |  |  |  |  |  |
| 03         | 2404                                 | 33      | 2434      | 63      | 2464      |  |  |  |  |  |
| 04         | 2405                                 | 34      | 2435      | 64      | 2465      |  |  |  |  |  |
| 05         | 2406                                 | 35      | 2436      | 65      | 2466      |  |  |  |  |  |
| 06         | 2407                                 | 36      | 2437      | 66      | 2467      |  |  |  |  |  |
| 07         | 2408                                 | 37      | 2438      | 67      | 2468      |  |  |  |  |  |
| 08         | 2409                                 | 38      | 2439      | 68      | 2469      |  |  |  |  |  |
| 09         | 2410                                 | 39      | 2440      | 69      | 2470      |  |  |  |  |  |
| 10         | 2411                                 | 40      | 2441      | 70      | 2471      |  |  |  |  |  |
| 11         | 2412                                 | 41      | 2442      | 71      | 2472      |  |  |  |  |  |
| 12         | 2413                                 | 42      | 2443      | 72      | 2473      |  |  |  |  |  |
| 13         | 2414                                 | 43      | 2444      | 73      | 2474      |  |  |  |  |  |
| 14         | 2415                                 | 44      | 2445      | 74      | 2475      |  |  |  |  |  |
| 15         | 2416                                 | 45      | 2446      | 75      | 2476      |  |  |  |  |  |
| 16         | 2417                                 | 46      | 2447      | 76      | 2477      |  |  |  |  |  |
| 17         | 2418                                 | 47      | 2448      | 77      | 2478      |  |  |  |  |  |
| 18         | 2419                                 | 48      | 2449      | 78      | 2479      |  |  |  |  |  |
| 19         | 2420                                 | 49      | 2450      | 79      | 2480      |  |  |  |  |  |
| 20         | 2421                                 | 50      | 2451      |         |           |  |  |  |  |  |
| 21         | 2422                                 | 51      | 2452      |         |           |  |  |  |  |  |
| 22         | 2423                                 | 52      | 2453      |         |           |  |  |  |  |  |
| 23         | 2424                                 | 53      | 2454      |         |           |  |  |  |  |  |
| 24         | 2425                                 | 54      | 2455      |         |           |  |  |  |  |  |
| 25         | 2426                                 | 55      | 2456      |         |           |  |  |  |  |  |
| 26         | 2427                                 | 56      | 2457      |         |           |  |  |  |  |  |
| 27         | 2428                                 | 57      | 2458      |         |           |  |  |  |  |  |
| 28         | 2429                                 | 58      | 2459      |         |           |  |  |  |  |  |
| 29         | 2430                                 | 59      | 2460      |         |           |  |  |  |  |  |
| 30         | 2431                                 | 60      | 2461      |         |           |  |  |  |  |  |



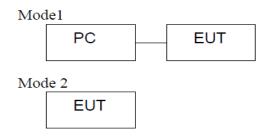
# Operation of EUT during testing

**Operating Mode** 

The mode is used: Transmitting mode

Low Channel: 2402MHz Middle Channel: 2441MHz High Channel: 2480MHz

## 2.2. Description of Test Setup



Setup: Transmitting mode



2.3. MEASUREMENT INSTRUMENTS LIST

| Item | Equipment  | Manufacturer            | Model No.  | Serial No.       | Last Cal.    | Cal. Interval |
|------|--|-------------------------|------------|------------------|--------------|---------------|
| 1.   | EMI Receiver   | Rohde & Schwarz         | ESCI       | 100627           | May 19, 2015 | 1 Year        |
| 2.   | LISN   | SchwarzBeck             | NSLK 8126  | 8126377          | May 19, 2015 | 1 Year        |
| 3.   | RF Switching Unit                                    | Compliance<br>Direction | RSU-M2     | 38303            | May 19, 2015 | 1 Year        |
| 4.   | EMI Test Software<br>ES-K1                           | Rohde & Schwarz         | N/A        | N/A              | N/A          | N/A           |
| 5.   | EMI Test Receiver                                    | Rohde & Schwarz         | ESCI       | 100627           | May 19, 2015 | 1 Year        |
| 6.   | Trilog Broadband<br>Antenna                          | Schwarzbeck             | VULB9163   | VULB<br>9163-289 | May 17, 2015 | 1 Year        |
| 7.   | Pre-amplifier  | Compliance<br>Direction | PAP-0203   | 22008            | May 19, 2015 | 1 Year        |
| 8.   | EMI Test Software<br>EZ-EMC                          | SHURPLE                 | N/A        | N/A              | N/A          | N/A           |
| 9.   | EMI Receiver   | Rohde & Schwarz         | ESCI       | 100627           | May 19, 2015 | 1 Year        |
| 10.  | LISN   | SchwarzBeck             | NSLK 8126  | 8126377          | May 19, 2015 | 1 Year        |
| 11.  | RF Switching Unit                                    | Compliance<br>Direction | RSU-M2     | 38303            | May 19, 2015 | 1 Year        |
| 12.  | EMI Test Software<br>ES-K1                           | Rohde & Schwarz         | N/A        | N/A              | N/A          | N/A           |
| 13.  | EMI Receiver   | Rohde & Schwarz         | ESCI       | 100627           | May 19, 2015 | 1 Year        |
| 14.  | EMI Receiver   | Rohde & Schwarz         | ESCI       | 100627           | May 19, 2015 | 1 Year        |
| 15.  | LISN   | SchwarzBeck             | NSLK 8126  | 8126377          | May 19, 2015 | 1 Year        |
| 16.  | RF Switching Unit                                    | Compliance<br>Direction | RSU-M2     | 38303            | May 19, 2015 | 1 Year        |
| 17.  | EMI Test Software<br>ES-K1                           | Rohde & Schwarz         | N/A        | N/A              | N/A          | N/A           |
| 18.  | Programmable AC Power source                         | SOPH POWER              | PAG-1050   | 630250           | May 26, 2015 | 1 Year        |
| 19.  | Harmonic and<br>Flicker Analyzer                     | LAPLACE                 | AC2000A    | 272629           | May 26, 2015 | 1 Year        |
| 20.  | Harmonic and<br>Flicker Test<br>Software<br>AC 2000A | LAPLACE                 | N/A        | N/A              | N/A          | N/A           |
| 21.  | ESD Simulators                                       | KIKUSUI                 | KES4021    | LJ003477         | May 25, 2015 | 1 Year        |
| 22.  | EFT Generator  | EMPEK                   | EFT-4040B  | 0430928N         | May 19, 2015 | 1 Year        |
| 23.  | Shielding Room                                       | ChangZhou<br>ZhongYu    | JB88       | SEL0166          | May 19, 2015 | 1 Year        |
| 24.  | Signal Generator<br>9KHz~2.2GHz                      | R&S                     | SML02      | SEL0143          | May 19, 2015 | 1 Year        |
| 25.  | Signal Generator<br>9KHz~1.1GHz                      | R&S                     | SML01      | SEL0135          | May 19, 2015 | 1 Year        |
| 26.  | Power Meter  | R&S                     | NRVS       | SEL0144          | May 19, 2015 | 1 Year        |
| 27.  | RF Level Meter                                       |                         | URV35      | SEL0137          | May 19, 2015 | 1 Year        |
| 28.  | Audio Analyzer                                       | R&S                     | UPL        | SEL0136          | May 19, 2015 | 1 Year        |
| 29.  | RF-Amplifier<br>150KHz~150MH                         | BONN Elektronik         | BSA1515-25 | SEL0157          | May 19, 2015 | 1 Year        |



Erika Fiedler VDE0872 SEL0167 N/A Stripline Test Cell 30. N/A TV Test Transmitter R&S SFM SEL0159 May 17, 2015 1 Year 31. TV Generator PAL R&S **SGPF** SEL0138 32. May 19, 2015 1 Year TV Generator Ntsc R&S **SGMF** SEL0140 33. May 19, 2015 1 Year TV Generator R&S SGSF SEL0139 34. May 19, 2015 1 Year Secam TV Test Transmitter R&S **SFQ** SEL0142 35. May 19, 2015 1 Year 0.3MHz~3300MHz MPEG2 R&S DVG SEL0141 36. Measurement May 19, 2015 1 Year Generator SEL0177 Spectrum Analyzer R&S FSP May 19, 2015 37. 1 Year Matching R&S **RAM** SEL0146 N/A 38. N/A R&S **RAM** SEL0148 N/A N/A Matching 39. May 17, 2015 Absorbing Clamp R&S MDS21 SEL0158 40. 1 Year Coupling Set Erika Fiedler Rco, Rci, SEL0149 N/A N/A 41. MC, AC, LC N/A Filters SEL0150 Erika Fiedler 42. Sr, LBS N/A N/A N/A Matching Network SEL0151 43. Erika Fiedler MN, T1 Fully Anechoic ChangZhou SEL0169 Jun. 10, 2015 44. 854 1 Year Room ZhongYu Signal Generator May 17, 2015 SEL0068 1 Year 45. R&S SML03 **RF-Amplifier Amplifier** SEL0066 Oct. 24, 2015 46. 250W1000A 1 Year 30M~1GHz Reasearch RF-Amplifier Amplifier SEL0065 Oct. 24, 2015 1 Year 47. 60S1G3 0.8~3.0GHz Reasearch NRVD Power Meter SEL0069 May 17, 2015 R&S 48. 1 Year Power Sensor R&S SEL0071 May 17, 2015 1 Year 49. URV5-Z2 Power Sensor R&S SEL0072 May 17, 2015 URV5-Z2 50. 1 Year Software R&S SEL0082 N/A N/A 51. EMC32-S EMC32 N/A Log-periodic Amplifier SEL0073 52. AT1080 N/A Antenna Reasearch Amplifier SEL0074 N/A N/A Antenna Tripod 53. TP1000A Reasearch High Gain Horn SEL0075 N/A 54. Amplifier Antenna(0.8-5G AT4002A N/A Reasearch Hz)



#### 3.. CONDUCTED EMISSIONS TEST

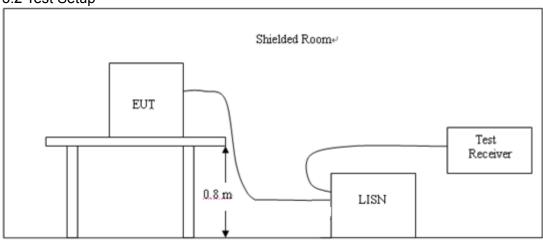
#### 3.1 Conducted Power Line Emission Limit

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

| Fraguanay          | M    | Maximum RF Line Voltage (dBμV) |         |        |  |  |  |  |
|--------------------|------|--------------------------------|---------|--------|--|--|--|--|
| Frequency<br>(MHz) | CLAS | SS A                           | CLASS B |        |  |  |  |  |
| (11112)            | Q.P. | Ave.                           | Q.P.    | Ave.   |  |  |  |  |
| 0.15 - 0.50        | 79   | 66                             | 66-56*  | 56-46* |  |  |  |  |
| 0.50 - 5.00        | 73   | 60                             | 56      | 46     |  |  |  |  |
| 5.00 - 30.0        | 73   | 60                             | 60      | 50     |  |  |  |  |

\* Decreasing linearly with the logarithm of the frequency
For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

#### 3.2 Test Setup



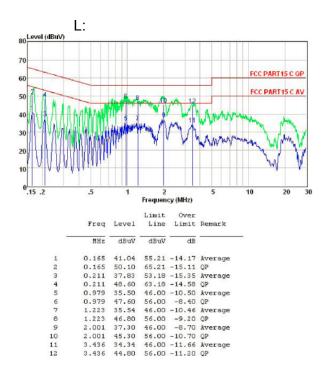
#### 3.3 Test Procedure

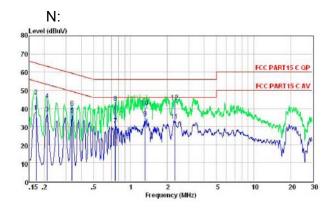
- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4.
- 2, Support equipment, if needed, was placed as per ANSI C63.4.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.



## 3.4 Test Result

## **PASS**





|    | Freq  | Level | Limit<br>Line | Over<br>Limit | Remark  |
|----|-------|-------|---------------|---------------|---------|
| -  | MHz   | dBuV  | dBuV          | dB            |         |
| 1  | 0.170 | 38.19 | 54.94         | -16.75        | lverage |
| 2  | 0.170 | 46.80 | 64.94         | -18.14        | QP      |
| 3  | 0.211 | 37.04 | 53.18         | -16.14        | Average |
| 4  | 0.211 | 44.50 | 63.18         | -18.68        | QP      |
| 5  | 0.336 | 36.57 | 49.31         | -12.74        | Average |
| 6  | 0.336 | 40.30 | 59.31         | -19.01        | QP      |
| 7  | 0.755 | 30.86 | 46.00         | -15.14        | Average |
| 8  | 0.755 | 43.20 | 56.00         | -12.80        | QP      |
| 9  | 1.317 | 34.66 | 46.00         | -11.34        | Average |
| 10 | 1.317 | 40.60 | 56.00         | -15.40        | QP      |
| 11 | 2.309 | 33.33 | 46.00         | -12.67        | Average |
| 12 | 2.309 | 43.80 | 56.00         | -12.20        | QP      |



## **4 RADIATED EMISSION TEST**

#### 4.1 Radiation Limit

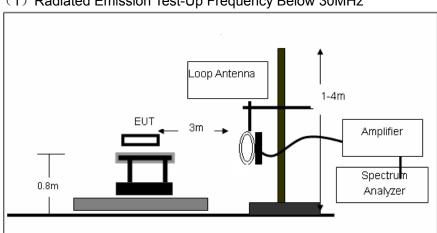
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following

| Frequency<br>(MHz) | Distance<br>(Meters) | Radiated<br>(dBµV/m) | Radiated (µV/m) |
|--------------------|----------------------|----------------------|-----------------|
| 30-88              | 3                    | 40                   | 100             |
| 88-216             | 3                    | 43.5                 | 150             |
| 216-960            | 3                    | 46                   | 200             |
| Above 960          | 3                    | 54                   | 500             |

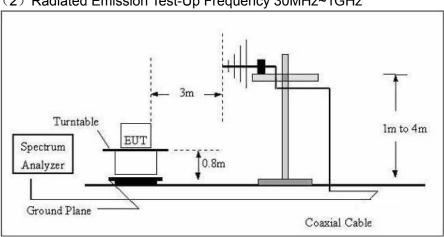
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

#### 4.2 Test Setup

## (1) Radiated Emission Test-Up Frequency Below 30MHz

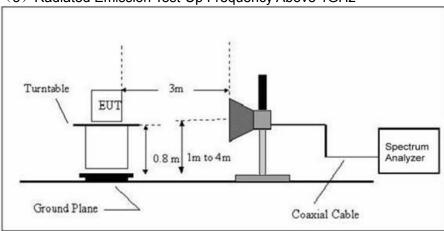


#### (2) Radiated Emission Test-Up Frequency 30MHz~1GHz





(3) Radiated Emission Test-Up Frequency Above 1GHz



#### 4.3 Test Procedure

- 1. The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6. Repeat above procedures until the measurements for all frequencies are complete.
- 7. Based on the Frequency Generator in the device include 26MHz. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

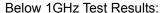
#### Note:

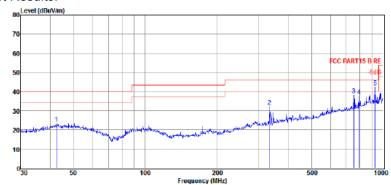
Three axes are chosen for pretest, the Y axis is the worst mode for final test. For battery operated equipment, the equipment tests shall be performed using a new battery.

#### 4.4 Test Result

#### **PASS**

All the test modes completed for test. The worst case of Radiated Emission is playing music; the test data of this mode was reported.

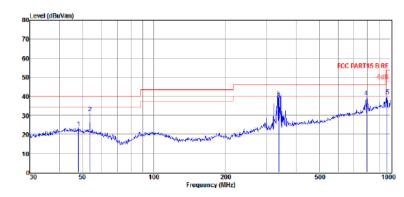




| Item<br>(Mark) | Freq<br>(MHz) | Read<br>Level<br>(dBµV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>dB | Result<br>Level<br>(dBµV/m) | Limit<br>Line<br>(dBµV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 42.45         | 4.59                    | 14.90                       | 3.81                | 23.30                       | 40.00                     | -16.70                | Peak     | VERTICAL     |
| 2              | 333.69        | 12.58                   | 14.06                       | 5.54                | 32.18                       | 46.00                     | -13.82                | Peak     | VERTICAL     |
| 3              | 755.39        | 11.45                   | 19.67                       | 7.00                | 38.12                       | 46.00                     | -7.88                 | Peak     | VERTICAL     |
| 4              | 793.40        | 10.32                   | 20.33                       | 7.10                | 37.75                       | 46.00                     | -8.25                 | Peak     | VERTICAL     |
| 5              | 925.76        | 13.01                   | 21.92                       | 7.46                | 42.39                       | 46.00                     | -3.61                 | Peak     | VERTICAL     |

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

  2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
  - 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.



| Item<br>(Mark) | Freq<br>(MHz) | Read<br>Level<br>(dBµV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>dB | Result<br>Level<br>(dBµV/m) | Limit<br>Line<br>(dBµV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 47.99         | 4.71                    | 14.70                       | 3.88                | 23.29                       | 40.00                     | -16.71                | Peak     | HORIZONTAL   |
| 2              | 53.69         | 13.06                   | 14.20                       | 3.92                | 31.18                       | 40.00                     | -8.82                 | Peak     | HORIZONTAL   |
| 3              | 337.22        | 18.50                   | 14.14                       | 5.54                | 38.18                       | 46.00                     | -7.82                 | QP       | HORIZONTAL   |
| 4              | 790.62        | 12.08                   | 20.29                       | 7.10                | 39.47                       | 46.00                     | -6.53                 | Peak     | HORIZONTAL   |
| 5              | 968.93        | 11.21                   | 21.44                       | 7.58                | 40.23                       | 54.00                     | -13.77                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

- If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
   Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

#### Remark:

- (1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.



Above 1 GHz Test Results:

CH Low (2402MHz) Horizontal/ Vertical

|                                       | Freq.   | Receiver<br>Reading | Detector    | Polar | Corrected Factor | Emission<br>Level | Limit    | Result |
|---------------------------------------|---------|---------------------|-------------|-------|------------------|-------------------|----------|--------|
|                                       | (MHz)   | (dBµV)              | (PK/QP/Ave) | (H/V) | (dB)             | (dBµV/m)          | (dBµV/m) | Result |
|                                       | 2402.00 | 103.45              | PK          | Н     | 1.31             | 104.76            | 114.00   | Pass   |
| -                                     | 2402.00 | 89.18               | Ave         | Н     | 1.31             | 90.49             | 94.00    | Pass   |
| Lower<br>Channel                      | 4804.00 | 57.87               | PK          | Н     | -1.06            | 56.81             | 74.00    | Pass   |
| 2402MHz                               | 4804.00 | 48.87               | Ave         | Н     | -1.06            | 47.81             | 54.00    | Pass   |
|                                       | 2402.00 | 102.36              | PK          | ٧     | 1.31             | 103.67            | 114.00   | Pass   |
| -                                     | 2402.00 | 88.46               | Ave         | ٧     | 1.31             | 89.77             | 94.00    | Pass   |
| -                                     | 4804.00 | 58.89               | PK          | ٧     | -1.06            | 57.83             | 74.00    | Pass   |
|                                       | 4804.00 | 47.38               | Ave         | ٧     | -1.06            | 46.32             | 54.00    | Pass   |
| · · · · · · · · · · · · · · · · · · · |         | 1                   |             |       |                  |                   |          | ,      |
|                                       | 2441.00 | 103.30              | PK          | Н     | 0.85             | 104.15            | 114.00   | Pass   |
|                                       | 2441.00 | 88.71               | Ave         | Н     | 0.85             | 89.56             | 94.00    | Pass   |
|                                       | 4882.00 | 54.70               | PK          | Н     | -0.62            | 54.08             | 74.00    | Pass   |
| Middle<br>Channel                     | 4882.00 | 43.83               | Ave         | Н     | -0.62            | 43.21             | 54.00    | Pass   |
| 2441MHz                               | 2441.00 | 103.21              | PK          | ٧     | 0.85             | 104.06            | 114.00   | Pass   |
|                                       | 2441.00 | 88.09               | Ave         | ٧     | 0.85             | 88.94             | 94.00    | Pass   |
|                                       | 4882.00 | 55.62               | PK          | ٧     | -0.62            | 55.00             | 74.00    | Pass   |
|                                       | 4882.00 | 44.90               | Ave         | ٧     | -0.62            | 44.28             | 54.00    | Pass   |
| -                                     |         | 1                   |             |       | ·<br>            | 1                 | <u> </u> | 1      |
|                                       | 2480.00 | 103.52              | PK          | Н     | 0.53             | 104.05            | 114.00   | Pass   |
|                                       | 2480.00 | 88.79               | Ave         | Н     | 0.53             | 89.32             | 94.00    | Pass   |
|                                       | 4960.00 | 52.81               | PK          | Н     | -0.24            | 52.57             | 74.00    | Pass   |
| Upper                                 | 4960.00 | 43.73               | Ave         | Н     | -0.24            | 43.49             | 54.00    | Pass   |
| Channel<br>2480MHz                    | 2480.00 | 102.65              | PK          | ٧     | 0.53             | 103.18            | 114.00   | Pass   |
|                                       | 2480.00 | 88.06               | Ave         | ٧     | 0.53             | 88.59             | 94.00    | Pass   |
|                                       | 4960.00 | 55.00               | PK          | ٧     | -0.24            | 54.76             | 74.00    | Pass   |
|                                       | 4960.00 | 43.94               | Ave         | ٧     | -0.24            | 43.70             | 54.00    | Pass   |



Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Data of measurement within this frequency range shown "--- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



**5 BAND EDGE** 

#### 5.1 Limits

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

#### 5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 100KHz and VBM to 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBM to 300 KHz, to measure the conducted peak band edge.

#### 5.3 Test Result

#### **PASS**

| Frequency<br>(MHz) | Antenna<br>polarization | Emission<br>(dBuV/m) |       |       | Result |
|--------------------|-------------------------|----------------------|-------|-------|--------|
|                    | (H/∨)                   | PK                   | PK    | AV    | Pass   |
| <2400              | Н                       | 50.45                | 74.00 | 54.00 | Pass   |
| <2400              | V                       | 50.27                | 74.00 | 54.00 | Pass   |
| >2483.5            | Н                       | 49.83                | 74.00 | 54.00 | Pass   |
| >2483.5            | V                       | 50.18                | 74.00 | 54.00 | Pass   |



#### 6 OCCUPIED BANDWIDTH MEASUREMENT

#### 6.1 Test Setup

Same as Radiated Emission Measurement

#### 6.2 Test Procedure

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. Set EUT as normal operation.
- 3. Based on FCC Part15 C Section 15.239(a): RBW= 10KHz. VBW= 30 KHz, Span=1MHz.
- 4. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

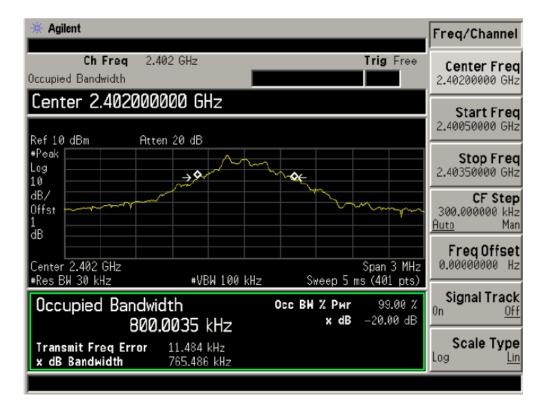
#### 6.3 Measurement Equipment Used

Same as Radiated Emission Measurement

#### 6.4 Test Result

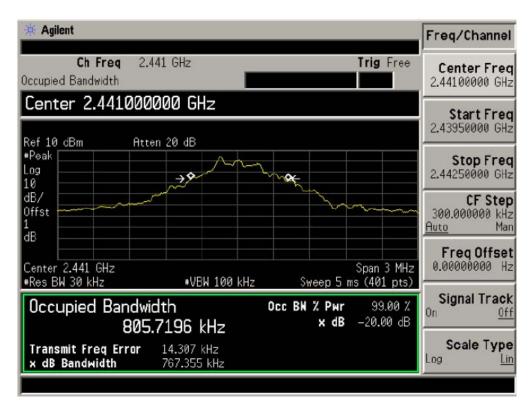
#### **PASS**

CH: 2402MHz





CH: 2441MHz



CH: 2480MHz





#### 7 ANTENNA REQUIREMENT

#### **Standard Applicable**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

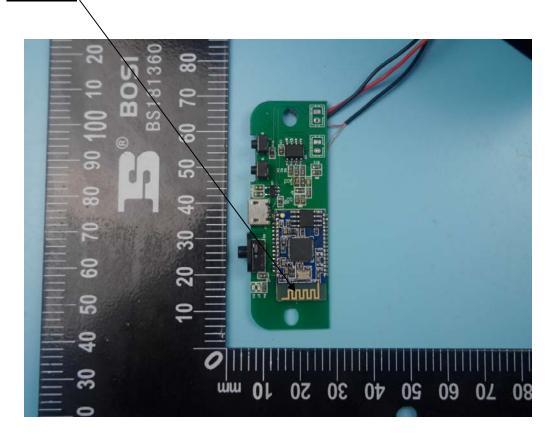
#### Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

#### **Antenna Connected Construction**

The antenna used in this product is a PCB Antenna, The directional gains of antenna used for transmitting is 0dBi.

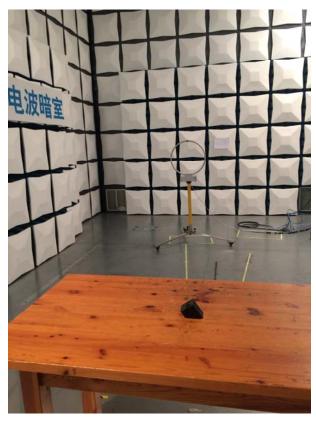
#### **ANTENNA**





# 8 PHOTOGRAPH OF TEST

# 8.1 Radiated Emission











# 8.2 AC Power Line Conducted Emission

